

Claims

- [c1] ~~Sub A1~~ 1. A connector which comprises:
- (a) an inner polymeric liner having two opposed flared ends and a centrally disposed bore therethrough;
 - (b) a bendable outer metallic sleeve having two opposed flared ends of essentially similar geometry to said polymeric liner flared ends; and
 - (c) two outwardly facing threaded nuts, each of said nuts having a shelf which engages said opposed flared ends of said metallic sleeve.
- [c2] 2. The connector of claim 1 wherein said metallic sleeve further comprises
- (a) a ribbed segment between said two opposed flared ends of said metallic sleeve.
- [c3] 3. The connector of claim 2 which further comprises
- (a) two washers for sealing engagement with each interior end portion of said liner.
- [c4] ~~Sub C~~ 4. The connector of claim 3 wherein
- (a) said inner polymeric liner essentially conforms to said ribbed segment.
- [c5] ~~Sub A2~~ 5. A connector which comprises:
- (a) an inner polymeric liner having two opposed flared ends and a centrally disposed bore therethrough;
 - (b) a bendable outer metallic sleeve having two opposed flared ends of essentially similar geometry to said polymeric liner flared ends and a plurality of ribs between said two opposed flared ends of said metallic sleeve; and
 - (c) two outwardly facing threaded nuts, each of said nuts having a shelf which engages said opposed flared ends of said metallic sleeve.
- [c6] ~~Sub C~~ 6. The connector of claim 5 wherein
- (a) said inner polymeric liner essentially conforms to said ribbed segment.
- [c7] 7. The connector of claim 6 which further comprises
- (a) two washers for sealing engagement with each interior end portion of said liner.
- [c8] ~~Sub A3~~ 8. A connector which comprises:
- (a) an inner polymeric liner having at least one flared end and a centrally disposed bore therethrough;

(b)a bendable outer metallic sleeve having at least one flared end of essentially similar geometry to said at least one polymeric liner flared end; and
(c)at least one outwardly facing threaded nut, said nut having a shelf which engages said at least one flared end of said metallic sleeve.

[c9] Sub c. 9.The connector of claim 8 wherein said metallic sleeve further comprises
(a)a ribbed segment in said metallic sleeve.

[c10] 10.The connector of claim 9 which further comprises
(a)at least one washer for sealing engagement at least one flared end interior end portion of said liner.

[c11] 11.The connector of claim 10 wherein
(a)said inner polymeric liner essentially conforms to said ribbed segment.

[c12] Sub a. 12.A connector which comprises:
(a)an inner polymeric liner having one flared end and an opposed integrally molded sealing end, said liner having a centrally disposed bore therethrough, and wherein said sealing end comprises
(i)a radially extending sealing surface from said liner, and
(ii)a shoulder which terminates the sealing surface, and wherein said bore of said sealing end is essentially the same as said bore of said liner,
(b)a bendable outer metallic sleeve having two opposed flared ends of essentially similar geometry to each of said polymeric liner flared end and said shoulder of said sealing end; and
(c)two outwardly facing threaded nuts, each of said nuts having a shelf which engages said opposed flared ends of said metallic sleeve.

[c13] Sub c. 13.The connector of claim 12 wherein said metallic sleeve further comprises
(a)a ribbed segment between said two opposed flared ends of said metallic sleeve.

[c14] 14.The connector of claim 13 which further comprises
(a)a washer for sealing engagement with an interior end portion of said liner at said flared end.

[c15] 15.The connector of claim 14 wherein

(a)said inner polymeric liner essentially conforms to said ribbed segment.

[c16] Sub 15 16.A connector which comprises:

(a)an inner polymeric liner having one flared end and an opposed integrally molded sealing end, said liner having a centrally disposed bore therethrough, and wherein said sealing end comprises

(i)a radially extending sealing surface from said liner, and

(ii)a shoulder which terminates the sealing surface, and wherein said bore of said sealing end is essentially the same as said bore of said liner,

(b)a bendable outer metallic sleeve having two opposed flared ends of essentially similar geometry to each of said polymeric liner flared end and said shoulder of said sealing end and a plurality of ribs between said two opposed flared ends of said metallic sleeve, and

(c)two outwardly facing threaded nuts, each of said nuts having a shelf which engages said opposed flared ends of said metallic sleeve.

[c17] Sub 16 17.The connector of claim 16 wherein

(a)said inner polymeric liner essentially conforms to said ribbed segment.

[c18] 18.The connector of claim 17 which further comprises

(a)a washer for sealing engagement with an interior end portion of said liner at said flared end.

[c19] 19.A process which comprises:

(a)heating one end of a polymeric tube having a centrally disposed bore therethrough;

(b)inserting a pin into said heated tube end;

(c)flaring said heated tube end;

(d)inserting a metallic sleeve having two outwardly facing nuts over said tube, said metallic sleeve having a flare on each end;

(e)heating an opposed end of said polymeric tube;

(f)inserting a pin into said opposed end; and

(g)flaring said opposed heated tube end.

[c20]

20.The process of claim 19 wherein

(a)said pin has an outer diameter which increases radially from a top of said pin.

[c21]

21.A process which comprises:

- (a)heating one end of a polymeric tube having a centrally disposed bore therethrough;
- (b)inserting a pin into said heated tube end;
- (c)flaring said heated tube end;
- (d)inserting a metallic sleeve having two outwardly facing nuts over said tube, said metallic sleeve having a flare on each end;
- (e)heating an opposed end of said polymeric tube to a melt processing temperature of said polymer; and
- (f)forming a sealing end from a polymer wall of said heated opposed end, said sealing end comprising
 - (i)a radially extending sealing surface from said end of said tube, and
 - (ii)a shoulder which terminates the sealing surface, and wherein said bore of said sealing end is essentially the same as said bore of said polymeric tube.

[c22]

22.The process of claim 21 wherein

- (a)said pin has an outer diameter which increases radially from a top of said pin.

[c23]

23.A process which comprises:

- (a)heating one end of a polymeric tube having a centrally disposed bore therethrough;
- (b)inserting a pin into said heated tube end;
- (c)flaring said heated tube end;
- (d)heating a non-end portion of said polymeric tube;
- (e)inserting a metallic sleeve having two outwardly facing nuts over said tube, said sleeve having at least one ribbed portion between said sleeve ends, said metallic sleeve having a flare on each end;
- (f)sealing both ends of said polymeric tube;
- (g)increasing a pressure within the sealed tube to radially expand said tube in said heated non-end portion which corresponds at least in part with said ribbed portion;
- (h)heating an opposed end of said polymeric tube; and

(i)flaring said opposed heated tube end to form a flared end.

[c24]

24.The process of claim 23 wherein

(a)said pin has an outer diameter which increases radially from a top of said pin.

[c25]

25.The process of claim 24 wherein

(a)said steps (h) and (i) follow step (e).

[c26]

26.A process which comprises:

(a)heating one end of a polymeric tube having a centrally disposed bore therethrough;

(b)inserting a pin into said heated tube end;

(c)flaring said heated tube end;

(d)inserting a flared metallic sleeve having two outwardly facing nuts over said tube, said sleeve having at least one ribbed portion between said sleeve ends;

(e)heating said ribbed portion of said metallic sleeve;

(f)sealing both ends of said polymeric tube;

(g)increasing a pressure within the sealed tube to radially expand said tube in said heated non-end portion which corresponds at least in part with said ribbed portion;

(h)heating an opposed end of said polymeric tube; and

(i)flaring said opposed heated tube end to form a flared end.

[c27]

27.The process of claim 26 wherein

(a)said pin has an outer diameter which increases radially from a top of said pin.

[c28]

28.The process of claim 27 wherein

(a)said steps (h) and (i) follow step (d).

[c29]

29.A process which comprises:

(a)heating one end of a polymeric tube having a centrally disposed bore therethrough;

(b)inserting a pin into said heated tube end;

(c)flaring said heated tube end;

(d)heating a non-end portion of said polymeric tube;

(e)inserting a metallic sleeve having two outwardly facing nuts over said tube, said

sleeve having at least one ribbed portion between said sleeve ends, said metallic sleeve having a flare on each end;

(f)sealing both ends of said polymeric tube;

(g)increasing a pressure within the sealed tube to radially expand said tube in said heated non-end portion which corresponds at least in part with said ribbed portion;

(h)heating an opposed end of said polymeric tube to a melt processing temperature of said polymer; and

(i)forming a sealing end from a polymer wall of said heated opposed end, said sealing end comprising

(A)a radially extending sealing surface from said end of said tube, and

(B)a shoulder which terminates the sealing surface, and wherein said bore of said sealing end is essentially the same as said bore of said polymeric tube.

30.The process of claim 29 wherein

(a)said pin has an outer diameter which increases radially from a top of said pin.

31.The process of claim 30 wherein

(a)said steps (h) and (i) follow step (e).

32.A process which comprises:

(a)heating one end of a polymeric tube having a centrally disposed bore therethrough;

(b)inserting a pin into said heated tube end;

(c)flaring said heated tube end;

(d)inserting a flared metallic sleeve having two outwardly facing nuts over said tube, said sleeve having at least one ribbed portion between said sleeve ends;

(e)heating said ribbed portion of said metallic sleeve;

(f)sealing both ends of said polymeric tube;

(g)increasing a pressure within the sealed tube to radially expand said tube in said heated non-end portion which corresponds at least in part with said ribbed portion;

(h)heating an opposed end of said polymeric tube to a melt processing temperature of said polymer; and

(i)forming a sealing end from a polymer wall of said heated opposed end, said sealing end comprising

(A)a radially extending sealing surface from said end of said tube, and

(B)a shoulder which terminates the sealing surface, and wherein said bore of said sealing end is essentially the same as said bore of said polymeric tube.

[c33] 33.The process of claim 32 wherein

(a)said pin has an outer diameter which increases radially from a top of said pin.

[c34] 34.The process of claim 33 wherein

(a)said steps (h) and (i) follow step (d).

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